
Equipment installation and configuration

This chapter describes the installation of the Fibre Remote IPE as an integral part of the Meridian 1 system. It explains how to prepare the site and check the equipment before installing it.

System overview

Fibre Remote IPE service can be added to existing Meridian 1 system options 21E, 51, 51C, 61, 61C, 71, 81, and 81C originally installed and operating without Fibre Remote IPE, or it can be an integral part of a newly installed Meridian 1 system. In either case, the connection of the Fibre Remote IPE to the NT1P61 Fibre Superloop Network card over the fibre-optic link should begin after:

- A previously installed Meridian 1 system is upgraded to run on generic software X11 release 19 or higher. It should operate correctly.
- A newly installed system using generic software X11 release 21 or higher. It should operate correctly.

To install a new Meridian 1 system or expand an existing one, refer to *Meridian 1 system installation procedures* (553-3001-210). It provides the information on how to install, verify, and maintain the Meridian 1 system.

Adding one or more Fibre Remote IPE sites to a Meridian 1 system is treated as a straightforward system expansion, that is, the system should be fully operational before the Fibre Remote IPE equipment is installed and connected to Meridian 1. This simplifies installation and fault isolation during installation. To complete the installation of a Fibre Remote IPE site, you should perform the preinstallation procedures to prepare the site, install the fibre-optic link, and install and connect the equipment.

Preinstallation procedures include:

- Preparing the site
- Unpacking and inspecting the equipment
- Routing and splicing fibre-optic cables to create a fibre-optic link between two sites
- Connecting the fibre-optic link FC/PC optical connector to the Fibre Remote IPE
- Taking an inventory of Fibre Remote IPE equipment
- Selecting the Meridian 1 network slot for the NT1P61 Fibre Superloop Network card

Installation procedures include:

- Installing the NT1P61 Fibre Superloop Network card in the selected network card slot
- Installing the NT1P63 Electro-optical packlets into the NT1P61 Fibre Superloop Network card
- Installing the fibre-optic patchcords between the Fibre Superloop Network faceplate FC/PC optical connectors and the optical I/O panel at the rear of the Meridian 1 module housing the NT1P61 Fibre Superloop Network card
- Connecting the fibre-optic link FC/PC optical connector to the optical I/O panel at the rear of the Meridian 1 module housing the NT1P61 Fibre Superloop Network card
- Connecting the master system monitor and TTY terminal cables at the local site
- Connecting the fibre-optic link to the I/O panel
- Installing the Fibre Remote IPE column or cabinet
- Installing the NT1P62 Fibre Peripheral Controller card in Remote IPE module or cabinet controller card slot
- Installing the NT1P63 Electro-optical packet(s) on the NT1P62 Fibre Peripheral Controller card

- Installing the fibre-optic patchcords between the Fibre Peripheral Controller faceplate FC/PC optical connectors and the optical I/O panel at the rear of the module
- Connecting the slave system monitor and TTY terminal cables at the remote site
- Connecting the fibre-optic link to the Fibre Remote IPE

Fibre Remote IPE is offered in two versions to provide flexibility in line size and equipment location. These are:

- Floor-standing column
- Wall-mounted cabinet

Note: The floor-standing column consists of one IPE Module and houses up to 16 IPE cards. The wall-mounted cabinet may consist of only the main cabinet when 10 or fewer IPE cards are required, or the main and expansion cabinets when up to 16 IPE cards are required.

Preinstallation preparation

Preinstallation preparation consists of preparing the site, unpacking and inspecting components, taking inventory, selecting the network slot for the NT1P61 Fibre Superloop Network card, installing the card, installing the fibre-optic link, and preparing the remote site cables, grounding, power source, and the location of the Remote IPE column or cabinets.

Preparing the site

When preparing a site, you must address environmental, structural, and electrical factors. These factors must be considered for the entire system, that is, Meridian 1 and Fibre Remote IPE sites. This information is available in:

- *Meridian 1 installation planning* (553-3001-120)
- *Meridian 1 system engineering* (553-3001-151)
- *Meridian 1 power engineering* (553-3001-152)

To prepare the site for Fibre Remote IPE installation, you must first:

- 1 Install and verify the operation of Meridian 1 without linking Meridian 1 to the Fibre Remote IPE site(s). Refer to *Meridian 1 system installation procedures* (553-3001-210).
- 2 Install the Fibre Remote IPE column. Also refer to *Meridian 1 system installation procedures* (553-3001-210), or

 Install the cabinet version of Fibre Remote IPE as described in “Installing the wall-mounted cabinet” on page 65.
- 3 Route and splice the fibre-optic cable between the Meridian 1 site and Fibre Remote IPE site(s) as described in “Connecting the fibre-optic link to the Remote IPE Module” on page 64.

Unpacking and inspection

Unpack and inspect the equipment for damage. When unpacking, follow general precautions recommended by computer and telephone equipment manufacturers:

- Remove items that generate static charge from the installation site.
- Use antistatic spray if the site is carpeted.
- Ground yourself before handling any equipment.
- Remove equipment carefully from its packaging.
- Visually inspect the equipment for obvious faults or damage. Any damaged component must be reported to your sales representative and the carrier who delivered the equipment.
- Do not bend and twist the fibre-optic cables excessively. Make sure that the cable is not bent beyond the specified minimum bending radius of 1.4 inches (3.5 cm) when handled or installed.
- Hold the plug-in cards by their nonconducting edges and keep them in their antistatic bags until you are ready to install them.
- Do not stack the plug-in cards on top of each other.

Taking inventory

After the equipment has been unpacked and visually inspected, verify that all the equipment is at the site before the installation begins. Equipment received must be checked against the shipping documents. Any shortages must be noted and reported to your sales representative.

Installing the fibre-optic link

If the fibre-optic link already exists, check the fibre-optic link characteristics and the end-to-end loss to determine if the link can support a Fibre Remote IPE and, if it can, at what distance between Meridian 1 and the Fibre Remote IPE.

Consult your Northern Telecom distributor to learn how to verify that the existing fibre-optic link is suitable for the Fibre Remote IPE application and what equipment to use to do so.

To install the fibre-optic link to the Fibre Remote IPE, the link fibres must be terminated with FC/PC optical connectors at the Meridian 1 site. At the Fibre Remote IPE, the link fibers are also terminated with FC/PC optical connectors for the floor-standing modular system. For the wall-mounted cabinet system, however, the link fibres are terminated into a fibre management frame and continue from the fibre management frame to the Electro-optical packlet FC/PC optical connectors on the Fibre Peripheral Controller faceplate.

When routing the cables to the Meridian 1 column, the floor-standing Fibre Remote IPE column, or wall-mounted Fibre Remote IPE cabinet, take the following precautions:

- Do not bend the fibre-optic cable or individual fibres beyond the minimum bending radius of 1.4 inches (3.5 centimeters).
- Protect the exposed parts of the cable and fibres with plastic conduit.
- Terminate each selected fibre with an FC/PC optical connector (a fibre-optic cable may contain more fibres than required by the single or redundant link design). At the fibre management frame, the type of optical connectors used depends on the available frame optical connectors.

Mark each fibre with Tx (transmitting) or Rx (receiving) designator behind the FC/PC optical connector to identify its function in the link.

WARNING

When handling optical fibers, follow the recommended safety procedures at all times.

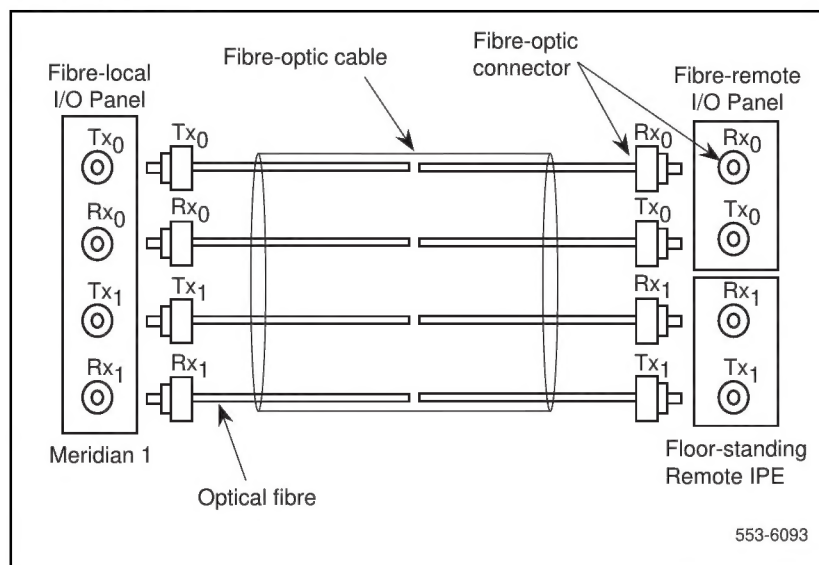
Before you can handle optical fibres, you must take necessary training and become certified in working with fibre-optic cables.

If possible, shut off power to all external transmission equipment so light beams will not be present at the exposed ends of the fiber cables. Keep all connectors capped while the cables are disconnected.

Handle fibers with extreme care. Observe a minimum bending radius of 1.4 inches (3.5 cm) at all times. Optical connections to the optical units should be finger-tightened only.

The link fibre marked Tx₀ at the remote site must be marked Rx₀ at the local site, and the link fibre marked Rx₀ at the remote site must be marked Tx₀ at the local site. For a redundant link, in addition to Tx₀ and Rx₀, Tx₁ at the remote site must be marked Rx₁ at the local site, and Rx₁ at the remote site must be marked Tx₁ at the local site as shown in Figure 8.

Figure 8
Fibre optic link



Selecting the Fibre Superloop Network card slot

The position of the NT1P61 Fibre Superloop Network card in Meridian 1 depends on the Meridian 1 system option installed at the local site. The system option determines what type of module will house the card.

Table 7 lists modules that provide network card slots, the system options where these modules are used, and card slots where network cards can be housed.

Table 7
Modules supporting a Fibre Superloop Network card

Modules	System option	Network card slot
NT5D21 Core/Network Module	51C, 61C, 81C	Card slots 0–7
NT8D11 CE/PE Module	21E	Card slots 4–9
NT8D35 Network Module	71, 81, 81C	Card slots 5–12
NT9D11 Core/Network Module	51C, 61C	Card slots 0–7
NT6D39 CPU/Network Module	51, 61	Card slots 1–8

Network card slots in modules listed in Table 7 also house other network-type cards that contend with the NT1P61 Fibre Superloop Network card for space in the module. If one or more network card slots are empty, where to install the NT1P61 Fibre Superloop Network card is determined as follows:

- 1 Check all network cards in the module and see if there are any NT8D04 Superloop Network cards.
- 2 If no NT8D04 Superloop Network cards are installed, you can use any empty network card slot to install an NT1P61 Fibre Superloop Network card.
- 3 If the module contains one or more NT8D04 Superloop Network cards, you must install the NT1P61 Fibre Superloop Network card at least one network card slot away from the NT8D04 Superloop Network card. Otherwise, refer to *Meridian 1 system engineering* (553-3001-151) for a detailed explanation of where to install the NT1P61 Fibre Superloop Network card when only slots adjacent to NT8D04 Superloop Network cards are available.

Note: Each network card slot supports two network loops. Although an NT8D04 Superloop Network card physically occupies only one card slot, it nevertheless occupies four network loops. That means that two network loops of an adjacent network card slot are also occupied by the NT8D04 Superloop Network card. Therefore, only a network card not requiring network loop access can be installed in the empty card slot whose network loops are being used by the NT8D04 Superloop Network card.

Meridian 1 fibre-optic equipment installation

To complete the installation of the fibre-optic interface that links Meridian 1 to the Fibre Remote IPE equipment, you must:

- Install and verify the operation of the Meridian 1 system, if it is not already installed and operating correctly
- Identify the network card slot and install the NT1P61 Fibre Superloop Network card in Meridian 1
- Install the NT1P75 fibre-optic patchcords
- Connect the fibre-optic link to the optical I/O panel

Installing and verifying Meridian 1 operation

The Fibre Remote IPE facilities can be added to an existing Meridian 1 system running on X11 release 19 or higher, by installing the appropriate electro-optical equipment in the system, installing one or more Fibre Remote IPEs at different remote sites, and linking Meridian 1 with remote sites using single or redundant fibre-optic links.

To install a new Meridian 1 system, follow the instructions in *Meridian 1 system installation procedures* (553-3001-210). It describes how to install a complete Meridian 1 system and how to connect the power, the internal and external communication cables, and subscriber loops.

If a new Meridian 1 system is configured with Fibre Remote IPE facilities, the system will normally be assembled at the factory with cards already installed and NT1P75 fibre-optic patchcords connected between the NT1P61 Fibre Superloop Network card faceplate and the optical I/O panel at the rear of the module housing this card. All you would have to do is connect the fibre-optic link to the Meridian 1 and the Fibre Remote IPE optical I/O panels to complete the link. However, if the card is not installed, follow the steps on page 48.

Installing the Fibre Superloop Network card

The purpose of the following steps is to instruct you how and where to install the Superloop Network card(s). In a new Meridian 1 system, the cards would have been installed in a network card slot at the factory; however, you may have to install additional NT1P61 Fibre Superloop Network cards to expand the number of remote sites or replace a defective card.

NT1P63 Electro-optical packlets, which are installed on the NT1P61 Fibre Superloop Network card, are normally installed in the factory, however, you may have to install an additional NT1P63 Electro-optical packlet on the NT1P61 Fibre Superloop Network card when you want to make a single fibre-optic link into a redundant link. The packlet and the card can be installed when the system is powered up and running.

To install these cards:

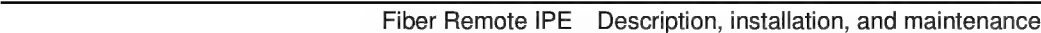
- 1** Set the ENB/DIS switch on the Fibre Superloop Network card to DIS.
- 2** Pull the NT1P61 Fibre Superloop Network card's upper locking device away from the faceplate and press the lower locking device downwards. While holding the card by these locking devices, insert it into the card guides of the selected network card slot.
- 3** Slide the card into the module until it engages the backplane connector.
- 4** Carefully push the upper locking device lever towards the faceplate and the lower locking device upwards to insert the card connector into the backplane connector and lock the card in place.
- 5** If not already installed, install the NT1P63 Electro-optical packlet(s) onto the NT1P61 Fibre Superloop Network card by inserting the NT1P63 Electro-optical packlet, connector first, through the NT1P61 Fibre Superloop Network card faceplate opening and plugging it into the connector on the NT1P61 Fibre Superloop Network card. For consistency, install the NT1P63 Electro-optical packlet into the top connector location if only one NT1P63 Electro-optical packlet is required (for nonredundant link operation). Install the blank packlet into the bottom connector location. For a redundant link, install both NT1P63 Electro-optical packlets.

- 6** Install the optical I/O patch-panel, which is a part of the NT1P76AA cable assembly, in the empty connector slot of the module's I/O panel by screwing its top and the bottom screws into the slot screw holes on the I/O panel. Use one connector slot for the FC/PC optical connectors that link the NT1P61 Fibre Superloop Network card and the NT1P63 Electro-optical packets to the fibre-optic link, as shown in Figure 9.
- 7** Use another empty connector slot in the I/O panel for the System Monitor/TTY ports I/O patch-panel, also part of the NT1P76AA cable assembly, as shown in Figure 10. Screw the top and the bottom screws of the cable's connector bracket into the connector slot screw holes on the I/O panel.
- 8** Set the ENB/DIS switch on the Fibre Superloop Network card to ENB and observe the LED on the card as it performs self-tests. The LED should blink three times and then stay ON until enabled by software. When enabled by software, the LED turns OFF permanently, if operational.

Installing fibre-optic patchcords

NT1P75 fibre-optic patchcords connect NT1P63 Electro-optical packets to fibre-optic connectors on the I/O panel at the rear of the network module housing the NT1P61 Fibre Superloop Network card. Figure 9 illustrates NT1P63 Electro-optical packet FC/PC fibre-optic connectors on the NT1P61 Fibre Superloop Network card and the I/O panel at the rear of the module. To install patchcords:

- 1 Carefully push each patchcord through the cable channel from the front of the module to the back. For a single fibre-optic link, use one patchcord that contains two fibres, one for the receive side and one for the transmit side. For a redundant link, you need two patchcords. When handling fibre-optic cables, do not bend them more than their minimum allowed bending radius of 1.4 inches (3.5 cm).
- 2 Install the optical I/O patch-panel in the empty connector slot of the module's I/O panel. Find an empty connector slot that matches the size of the patch-panel bracket and use two screws and two washers to install it on the I/O panel. The optical I/O patch-panel can contain up to four FC/PC fibre-optic connectors, which are used for a redundant link configuration.
- 3 Plug the NT1P75 fibre-optic patchcord FC/PC optical connectors into the appropriate NT1P63 Electro-optical packet FC/PC optical connectors on the NT1P61 Fibre Superloop Network card faceplate. The receive (Rx) is the top connector on each packet and transmit (Tx) is the bottom connector.
- 4 Plug the other NT1P75 fibre-optic patchcord FC/PC optical connectors into connectors at the optical I/O patch-panel at the rear of the module. Use Tx and Rx designators to identify transmit and receive patchcord connectors. Repeat this step for all patchcords.



Installing system monitor and TTY cables

The system monitor cable is normally installed in the factory and does not have to be installed at the site. The cable that has to be installed at the site is the cable connecting the terminal or TTY to the RJ45 connector on the I/O panel located at the rear of the module that contains the NT1P61 Fibre Superloop Network card.

Refer to Figure 10 to see the I/O panel and the top connector. The top connector is used to connect the terminal or TTY to the Fibre Superloop Network card when the MMI port is in the MMI mode, or to connect the Fibre Superloop Network card to an SDI port when the MMI port is in the SL-1 mode.

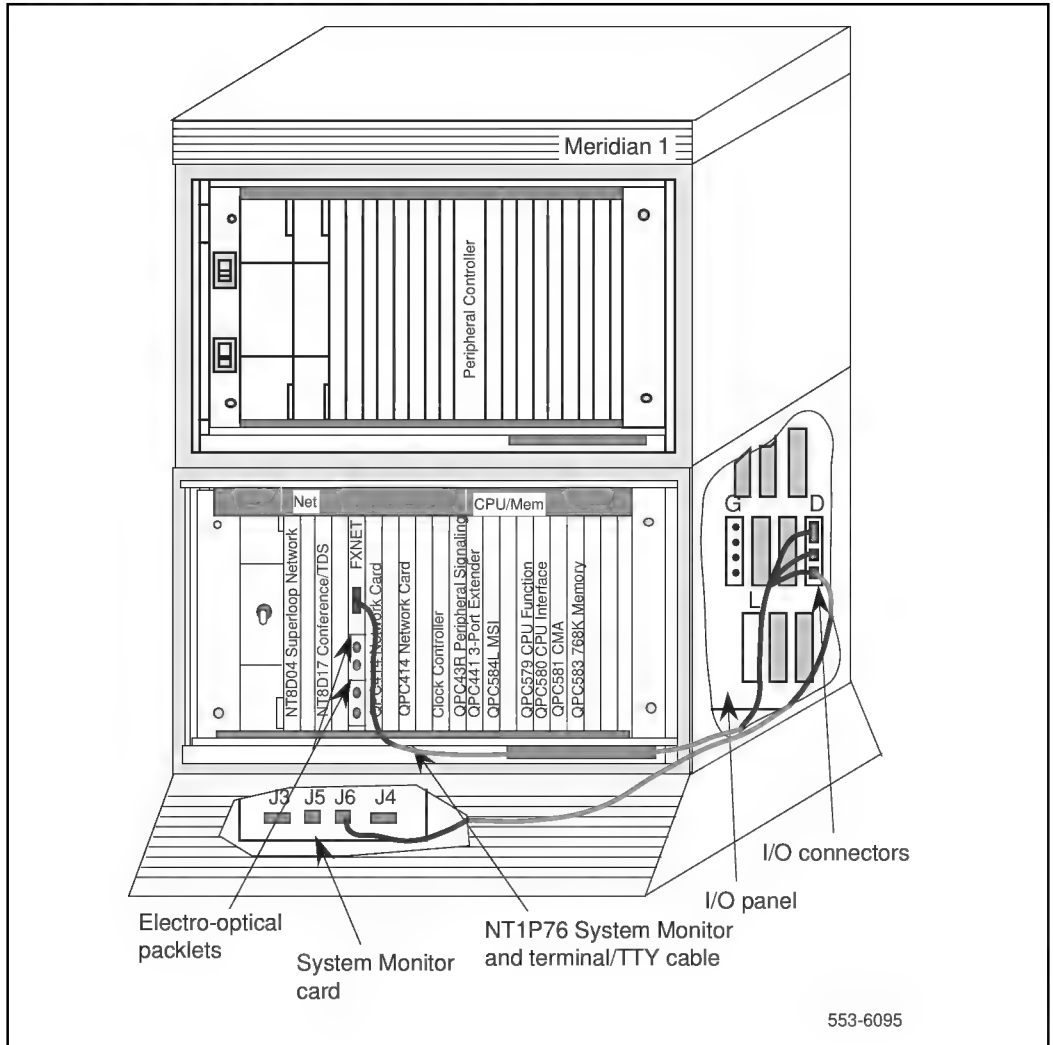
Note: To connect the Fibre Superloop Network card to an SDI port of the SDI cards such as NTND02BA, QPC841C, or QPC139B, you must connect the RJ45 connector on the I/O panel to the RS-232 port on the front panel of the SDI card. The cable must be a null modem type with pin 2 (TD) and pin 3 (RD) swapped and provide DSR and CTS pins high (+12 V), such cable is P0695821. To connect to an NT8D41AA SDI Paddle Board to the Fibre Superloop Network card, use NT8D84 AA and NT8D93AJ cables between the SDI port and the I/O panel at the rear of the module. For switch setting on individual SDI cards, refer to *Circuit card installation and testing* (553-3001-211).

In the local Meridian 1 column, the pedestal contains a master system monitor that monitors system alarms. Alarms from a Fibre Remote IPE site are reported over the fibre-optic link and the NT1P61 Fibre Superloop Network card to the Meridian 1 master system monitor and from there to the CPU. The CPU sends alarm messages to the system terminal or TTY identifying the problem.

Figure 10 shows NT1P61 Fibre Superloop Network card connections to the I/O panel to provide an MMI, a slave system monitor, and master system monitor port.

Figure 10 also shows the connection between the system monitor card and the master monitor port on the I/O panel.

Figure 10
System monitor and TTY cable connections



To connect the NT1P61 Fibre Superloop Network card to the system monitor in the pedestal, to the slave system monitor in an adjacent column, and to the terminal or TTY:

- 1** Plug the 15-pin D-type connector at the one end of the NT1P76AA cable into the 15-pin D-type connector located on the faceplate of the NT1P61 Fibre Superloop Network card.
- 2** Route the other end of the cable through the cable channel to the I/O panel at the back of the module with the NT1P61 Fibre Superloop Network card.
- 3** Install the electrical I/O patch-panel into an empty I/O panel connector slot by screwing the top and bottom screws of the cable connector bracket to the connector slot on the I/O panel. The electrical I/O patch-panel (bracket) is part of the NT1P76AA cable.
- 4** Plug the RJ11 connector at one end of the cable into the RJ11 receptacle on the I/O panel to provide an RS422 interface to the system monitor.
- 5** Plug the other end of the cable RJ11 connector into J6 receptacle on the system monitor in the pedestal.
- 6** Connect an RJ11 cable between the second RJ11 receptacle on the I/O panel and daisy-chain the I/O patch-panel connectors to other Fibre Superloop Network cards as shown in Figure 9, if required.
- 7** Plug the RJ45 connector at the one end of the A0361365 terminal cable into an empty connector slot on the I/O panel.
- 8** Plug the other end of the A0361365 terminal cable into the RJ45/RS232 adapter, and then plug this adapter into the terminal or TTY RS232 connector. An RJ45 to DB25 adapter can be used to connect a terminal that has a DB25 type connector for its RS232 interface.

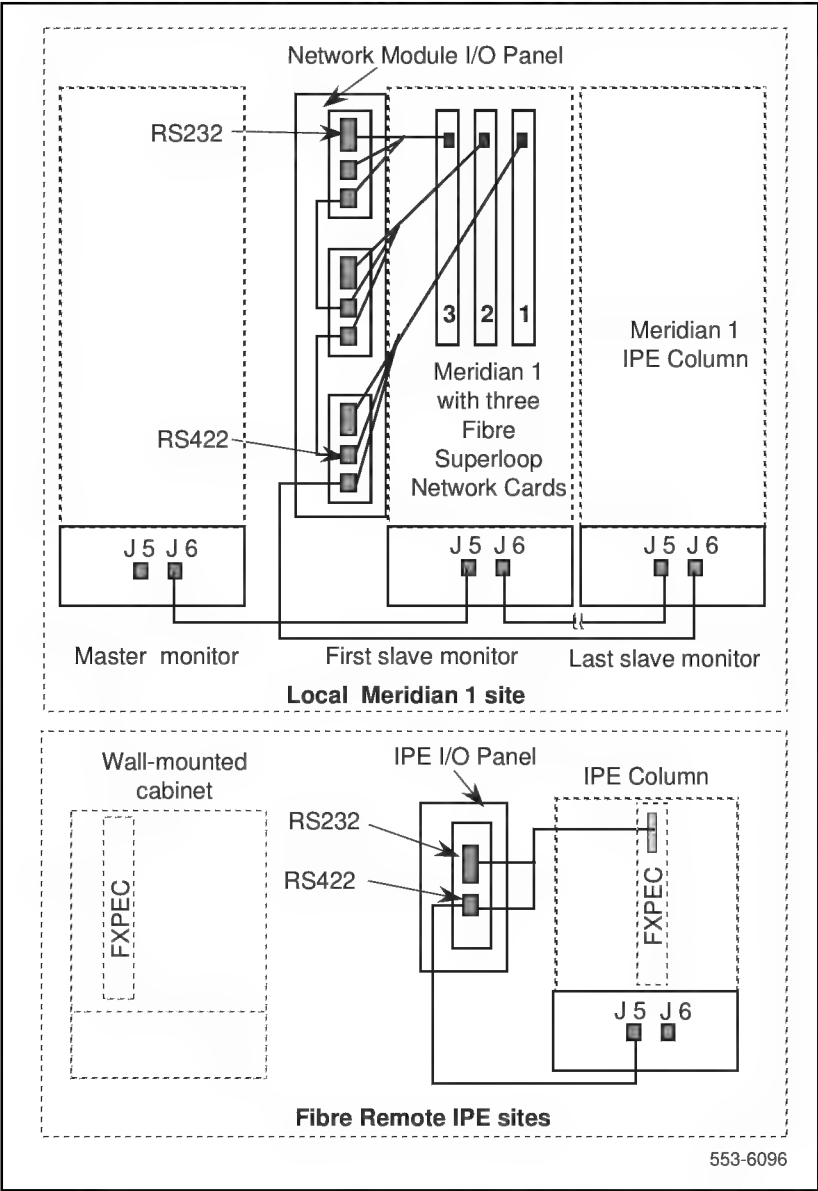
- 9 If the Fibre Superloop Network card is connected to an SDI card, connect the A0695821 cable to the SDI port in the module. This DB-25 male to DB-25 female cable is a null modem type with DSR and CTS pulled up to +12 V. Refer to *Circuit card installation and testing* (553-3001-211) for switch setting for the specific SDI card.
- 10 Plug the other end of the A0695821 cable into a DB-9 to DB-25 adapter and plug the DB-9 adapter connector into the DB-9 connector on the I/O patch-panel.

Figure 11 shows Meridian 1 columns and three NT1P61 Fibre Superloop Network cards that support three remote sites. Cable connected to the NT1P61 Fibre Superloop Network card faceplate connector provides an RS232 SDI/MMI port and two RS422 system monitor ports. Figure 11 also shows system monitor connections between multiple Fibre Superloop Network cards and the master system monitor residing in the pedestal. It shows the connection between the master and slave system monitors when multiple adjacent columns exist. At the remote site, the system monitor connects only to the module on top of the pedestal, as shown in the figure.

From Fibre Superloop Network #1, you can extend an RJ11 cable to the lowest slave system monitor J6 connector in the pedestal. This connection makes the three Fibre Superloop Network cards the lowest slave system monitors in the chain where Fibre Superloop Network card #3 is the lowest.

The Fibre Remote IPE alarms are received over the link and through the Fibre Superloop Network cards to the system monitor J6 connector.

Figure 11
System monitor connections at the Meridian 1 and the Fibre Remote IPE



Connecting the fibre-optic link to Meridian 1

Each required fibre of the fibre-optic cable, at each end of the link, must be terminated with an FC/PC optical connector. This connector plugs into the FC/PC optical connector on the I/O panel.

For a single link, you need to install connectors on only two fibres at each end of the link, one for the transmit side and one for the receive side. For a redundant link, four fibres must have connectors installed at each end.

To connect the link to the network optical I/O panel at the local Meridian 1 site:

- 1** Identify the link FC/PC optical connector marked Tx₀ and Rx₀ for a single link, or marked Tx₀, Rx₀, Tx₁, and Rx₁ for a redundant link.
- 2** Identify the transmit and receive connectors on the optical I/O panel (bracket) installed in an empty network I/O panel connector slot at the local Meridian 1 site.
- 3** Plug the link FC/PC optical connector marked Tx₀ into the I/O panel FC/PC optical connector marked Tx₀.
- 4** Plug the link FC/PC optical connector marked Rx₀ into the I/O panel FC/PC optical connector marked Rx₀.
- 5** Repeat steps 3 and 4 for the Tx₁ and Rx₁ if you have a redundant link.

Floor-standing column Fibre Remote IPE installation

To complete the installation of floor-standing Fibre Remote IPE equipment, you must:

- Install the floor-standing column
- Install the cards in the IPE Module
- Install the NT1P75 fibre-optic patchcords
- Connect the fibre-optic link to the optical I/O panel

Note: All Fibre Remote IPE modules or cabinets are installed in the factory with cards already in their respective card slots. The only exception is the power supply, which is packaged separately and must be installed at the site.

Installing the floor-standing column

The column is normally assembled in the factory with cards already installed and NT1P75 fibre-optic patchcords connected between the NT1P62 Fibre Peripheral Controller card faceplate and the optical I/O panel at the rear of the IPE Module.

If the column is not assembled in the factory, to install the Meridian 1 type modular column (floor-standing column) at the remote site, follow the instructions in *Meridian 1 system installation procedures* (553-3001-210). It describes how to install the pedestal, the IPE Module, and the top cap and how to connect the power, the internal and external communication cables, and subscriber loops.

To install the PFTU to the floor-standing Fibre Remote IPE, follow the instructions in *Meridian 1 system installation procedures* (553-3001-210).

Installing cards in the Remote IPE Module

The purpose of the following steps is to instruct you how and where to install the cards in the Remote IPE Module. Even though the cards might have been shipped installed from the factory, we provide step-by-step instructions for card installation, which should be followed when additional IPE cards are installed or defective cards are replaced.

NT1P63 Electro-optical packets, which are installed on the NT1P62 Fibre Peripheral Controller card, are normally installed in the factory; however, you may have to install an additional NT1P63 Electro-optical packet onto the NT1P62 Fibre Peripheral Controller card when you want to make a single fibre-optic link into a redundant link.

To install these cards:

- 1** Pull the NT1P62 Fibre Peripheral Controller card's upper locking device away from the faceplate and press the lower locking device downwards. Which holding the card by these locking devices, insert it into the card guides into the Controller slot left-hand card guide, which is located immediately to the right of slot 7.
- 2** Slide the card into the cabinet until it engages the backplane connector.
- 3** Push the upper locking device lever towards the faceplate and the lower locking device upwards to insert the card connector into the backplane connector and lock the card in place.
- 4** Observe the LED on the card as it performs self-tests. The LED should blink three times and then stay ON until enabled by software. When enabled by software, the LED turns OFF permanently, if operational.
- 5** Install the NT1P63 Electro-optical packet onto the NT1P62 Fibre Peripheral Controller card by inserting the NT1P63 Electro-optical packet, connector first, through the NT1P62 Fibre Peripheral Controller card faceplate opening and plugging it into the connector on the NT1P62 Fibre Peripheral Controller card. For consistency, install the NT1P63 Electro-optical packet into the top connector if only one Electro-optical packet is required (for single link operation). Install a blank packet in place of the second NT1P63 Electro-optical packet.
- 6** Install IPE cards in slots 0 through 7 and 8 through 15 by pulling the card locking devices away from the faceplate and inserting the cards into the card guides of an IPE card slot.
- 7** Slide the card into the module until it engages the backplane connector, and then push the locking device levers towards the faceplate to insert the card connector into the backplane connector and lock the card in place.
- 8** Repeat steps 6 and 7 for each IPE card.

- 9 Remove the back panel to access the I/O panel connector slots.
- 10 Install the optical I/O patch-panel in the empty connector slots of the IPE Module's I/O panel by using two screws and two washers for each connector. Use connector slots J2 and J3 for the FC/PC optical connectors that link the NT1P62 Fibre Peripheral Controller card and NT1P63 Electro-optical packlets, using patchcords, to the fibre-optic link, as shown in Figure 12. Use the empty J4 and J5 connector slots in the I/O Panel for the System Monitor and TTY I/O patch-panels, as shown in Figure 13.

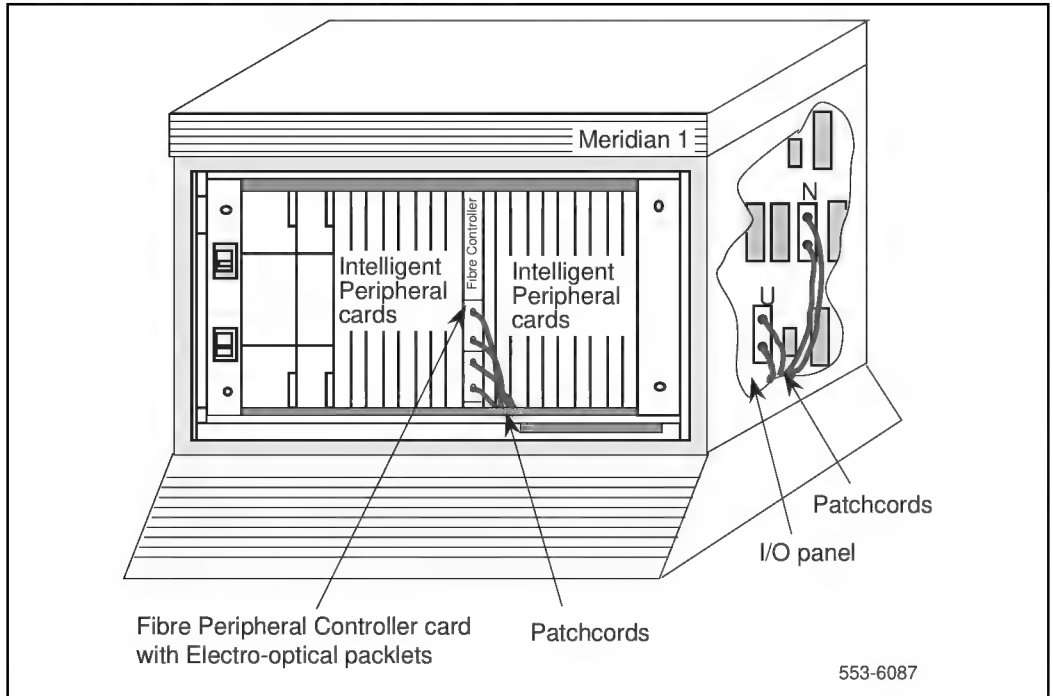
Installing fibre-optic patchcords

NT1P75 fibre-optic patchcords connect NT1P63 Electro-optical packlets to FC/PC fibre-optic connectors on the I/O panel at the rear of the IPE Module. Figure 12 illustrates NT1P63 Electro-optical packlets FC/PC fibre-optic connectors and FC/PC fibre-optic connectors on the I/O panel at the rear of the module. To install the patchcords:

- 1 Carefully push each NT1P75 fibre-optic patchcord through the cable channel from the front of the module to the back. For a single fibre-optic link, use one patchcord that contains two fibres, one for the receive side and one for the transmit side. For a redundant link you need two patchcords. When handling fibre-optic cables, do not bend them more than their minimum allowed bending radius of 1.4 inches (3.5 cm).
- 2 Plug NT1P75 fibre-optic patchcord FC/PC optical connectors into the appropriate NT1P63 Electro-optical packlet FC/PC optical connectors on the NT1P62 Fibre Peripheral Controller faceplate.
- 3 Plug the other NT1P75 fibre-optic patchcord FC/PC optical connectors to the FC/PC fibre-optic connectors on the I/O panel.
- 4 Repeat steps 2 and 3 for all patchcords.

Figure 12 shows the Fibre Remote IPE Module with IPE cards and the NT1P62 Fibre Peripheral Controller card already installed. It also shows the NT1P75 fibre-optic patchcords routing from the NT1P62 Fibre Peripheral Controller card faceplate to the module's FC/PC optical connectors on the I/O panel.

Figure 12
Patchcord connections on the IPE Module



Installing system monitor and TTY cables

The system monitor cable is normally installed in the factory and does not have to be installed at the site. The cable that has to be installed at the site is the cable connecting the terminal or TTY to the 9-pin D-type connector on the IPE Module I/O panel (the MMI port).

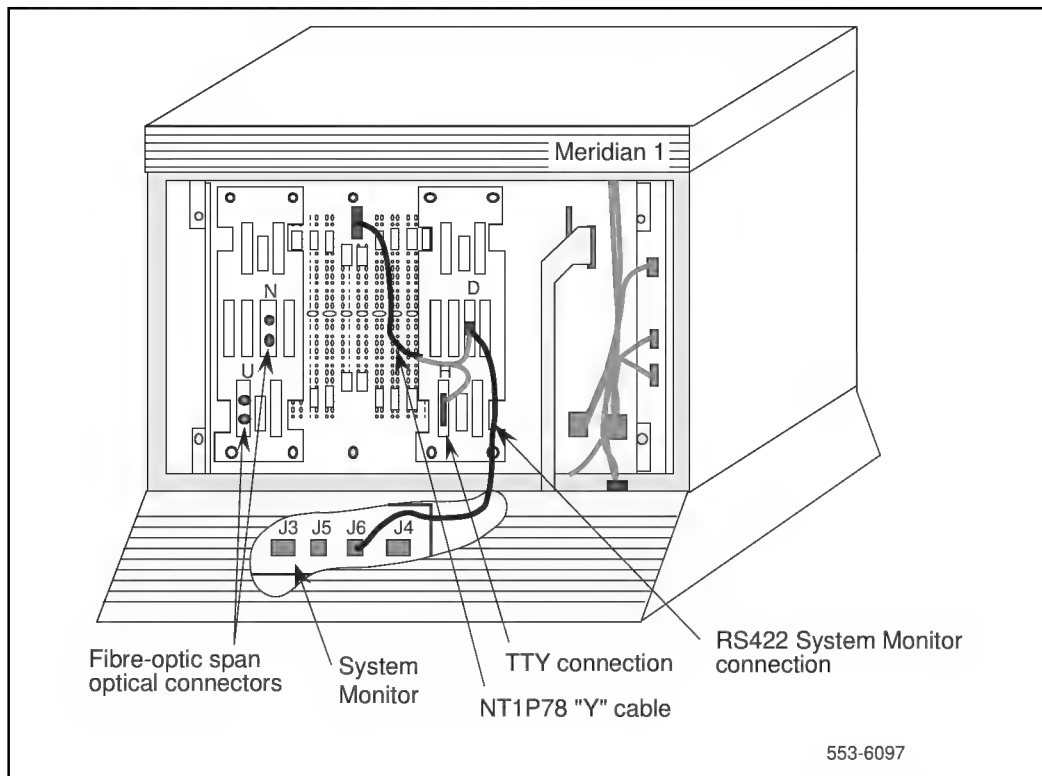
In the remote floor-standing column, the pedestal contains a slave system monitor used to monitor Fibre Remote IPE system alarms. These alarms are reported over the fibre-optic link and through the NT1P61 Fibre Superloop Network card to the Meridian 1 master system monitor and from there to the CPU. The CPU sends alarm messages to the system terminal or TTY identifying the problem.

These alarms are also displayed or printed on the remote site terminal or TTY. Figure 13 shows the system monitor and TTY cable connections for a floor-standing column.

To connect the NT1P62 Fibre Peripheral Controller card to the terminal or TTY and the slave system monitor in the pedestal; you must follow these steps to install NT1P78AA Y cable between the backplane and the I/O panel:

- 1** Plug the NT1P78AA cable 24-pin connector into the 24-pin connector (SL0 position) located at the top center of the backplane behind the NT1P62 Fibre Peripheral Controller card.
- 2** Install the NT1P78AA I/O D-type patch-panel into the empty connector slot of the IPE Module I/O panel.
- 3** Install the NT1P78AA cable RJ11 I/O patch-panel on the empty connector slot of the IPE Module I/O panel.
- 4** Plug the RJ11 connector at one end of the cable into the RJ11 receptacle on the IPE Module I/O panel. This cable provides an RS422 interface to the system monitor.
- 5** Plug the other end of the cable RJ11 connector into the J6 receptacle on the system monitor in the pedestal. Refer to Figure 11 for connecting system monitoring cables for a column with the IPE Module.

Figure 13
System monitor and TTY cable connections



- 6 Check the NT8D22 System Monitor factory switch settings for the slave system monitor. Refer to *Option settings, Circuit card installation and testing* (553-3001-211).
- 7 Plug the NTAK1108 9-pin D-type connector into the 9-pin D-type connector on the IPE Module I/O panel.
- 8 Plug the other end of the NTAK1108 cable into the terminal or TTY RS232 connector.

Connecting the fibre-optic link to the Remote IPE Module

The fibre-optic link connects the optical I/O panel connector at the rear of the Remote IPE Module to the optical I/O panel at the rear of the module housing the NT1P61 Fibre Superloop Network card in the Meridian 1 system. The routing and splicing of fibre-optic cables along the link should have been completed before the Fibre Remote IPE site installation.

Each fibre of the fibre-optic cable, at each end of the link, must be terminated with an FC/PC optical connector. This connector plugs into the FC/PC optical connector on the I/O panel.

For a single link, you need to connect only two fibres at the end of the cable, one for the transmit side and one for the receive side. For a redundant link, four fibres must be connected.

To connect the link to the Remote IPE I/O panel:

- 1 Identify one link fibre as Tx₀ and another as Rx₀ for a single link, or identify four fibres as Tx₀, Rx₀, Tx₁, and Rx₁ respectively for a redundant link.
- 2 Identify the transmit and receive connectors on the optical I/O panel at the rear of the Remote IPE Module.
- 3 Plug the link FC/PC optical connector marked Tx₀ into the I/O panel FC/PC optical connector marked Tx₀.
- 4 Plug the link FC/PC optical connector marked Rx₀ into the I/O panel FC/PC optical connector marked Rx₀.
- 5 Repeat steps 3 and 4 for the Tx₁ and Rx₁ if you have a redundant link.

Wall-mounted Fibre Remote IPE installation

To complete the installation of wall-mounted Fibre Remote IPE equipment, you must:

- Install the wall-mounted cabinet
- Install the cards in the cabinet
- Connect the fibre-optic link to the fibre management frame and the Fibre Peripheral Controller card

Installing the wall-mounted cabinet

To install NT1P70 main and NTAK12 expansion wall-mounted cabinets that house the Fibre Remote IPE, follow the instructions below.

The NT1P70 main wall-mounted cabinet is shipped from the factory completely installed, that is, all IPE cards and the NT1P62 Fibre Peripheral Controller card are already installed. The power supply is shipped separately. The NTAK12 expansion cabinet is optional and is ordered only if you require more than 10 IPE cards at the remote site.

To install wall-mounted Remote IPE cabinets, locate and prepare the wall area, install cabinets, connect the ground wires, and connect the power. When selecting the wall area for the cabinet installation, make sure you provide for convenient fibre-optic and subscriber loop cable routing.

To complete these tasks, follow the steps below:

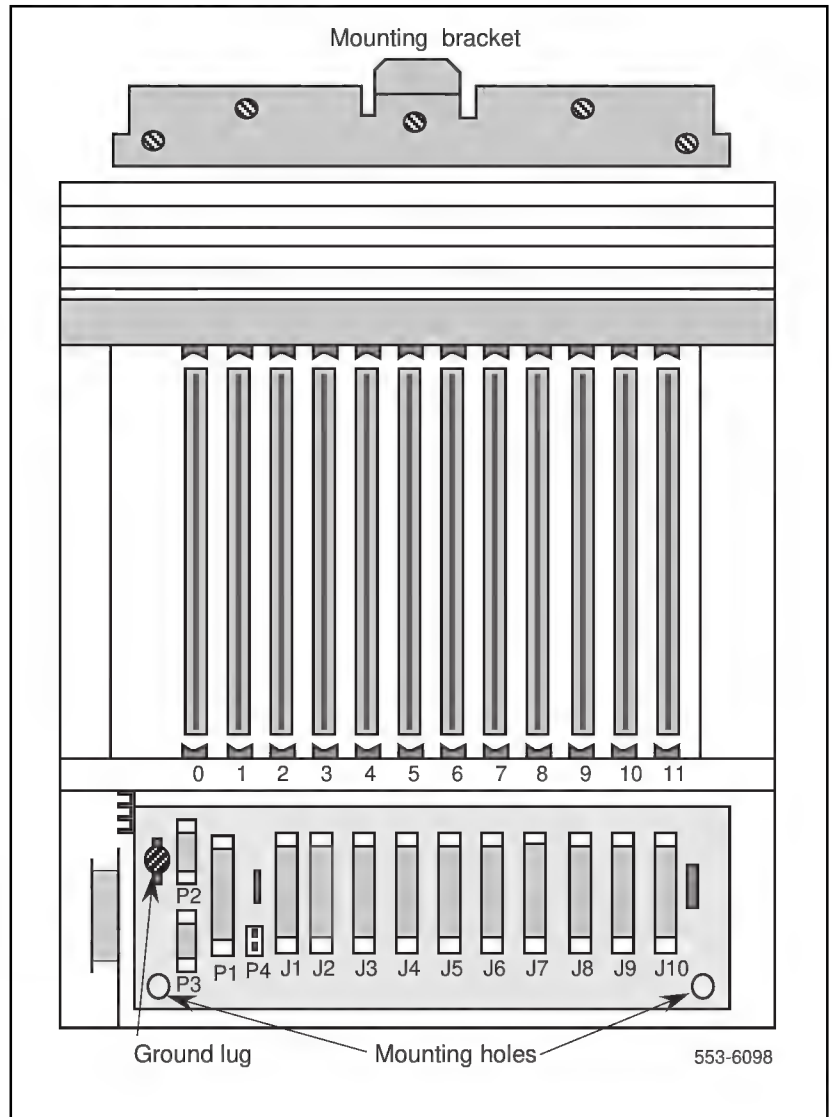
- 1** Unpack and inspect the cabinet.
- 2** Level and install the mounting bracket on the wall as shown in Figure 14. If you are installing the expansion cabinet next to the main cabinet, line up the two brackets and use the provided spacer between brackets.
- 3** Remove the front cover and all cards from the cabinet to make the cabinet lighter and to prevent card damage in case the cabinet drops when being installed on the wall.
- 4** Position the cabinet over the mounting bracket so that the bracket hook engages the slot at the rear of the cabinet. The slot is located at the top center of the cabinet as shown in Figure 14.

- 5** Bolt the cabinet down by using two wood screws at the lower front of the cabinet. See Figure 14 for the location of the screw holes.
- 6** Install the 6 AWG copper ground wire between the approved building ground and the ground lug at the bottom of the cabinet.
- 7** Repeat steps 3 through 6 for the expansion cabinet, if required.

Figure 14 shows the Fibre Remote IPE cabinet with the mounting bracket and the mounting holes. It also shows the ground lug for ground connection.

- 8** Install the power supply in slot 0 in the NT1P70 main cabinet shelf and turn the power switch to OFF.
- 9** At the building ground end of the wire, use two fastening clamps to connect the wire to the building ground, insulate the connection with electric tape, and post a DO NOT DISCONNECT tag.
- 10** Measure the ground resistance between the ground lug at the bottom of the NT1P70 main cabinet and the ground prong on the cabinet power cord. It should measure 0 Ohms. If the resistance is greater than 0 Ohms, check the ground terminal on the power supply power connector continuity to the cabinet chassis.
- 11** Connect the power cord from the IPE shelf power supply to the commercial AC power outlet for an AC system. For a DC system, connect the IPE shelf power converter cord to the DC power source.
- 12** Disconnect the building ground wire from the ground lug on the NT1P70 main cabinet and measure the resistance between the tip of the disconnected ground wire and the ground lug on the cabinet. If the resistance is more than 5 Ohms, check the building ground and the ground terminal at the AC wall outlet where the cabinet power cord is connected.
- 13** Disconnect the power cord from the wall outlet for the AC system or the DC power source for the DC system and reconnect the 6 AWG ground wire to the cabinet ground lug.
- 14** Reconnect the supply power cord to the AC power outlet for an AC system or to the DC source for a DC system.

Figure 14
Fibre Remote IPE cabinet



- 15 If the Fibre Remote IPE requires an expansion cabinet to accommodate up to 16 IPE cards, repeat steps 1 through 14 for the NTAK12 expansion cabinet.
- 16 Connect the NT1P70 main cabinet to the NTAK12 expansion cabinet by installing the cable between connector P1 of the main cabinet and P1 of the expansion cabinet.

This completes the cabinet installation and system ground test. You can now install the plug-in cards.

Installing cards in the wall-mounted cabinet

The purpose of the following steps is to instruct you how and where to install the cards in the Fibre Remote IPE cabinet. Even though the cards are shipped in the cabinet from the factory, for safety and ease of installation, you have removed these cards from the cabinet before you installed it onto the wall.

NT1P63 Electro-optical packlets, which are installed on the NT1P62 Fibre Peripheral Controller card, are normally installed in the factory; however, you may have to install an additional NT1P63 Electro-optical packlet on the NT1P62 Fibre Peripheral Controller card when you want to make a single fibre-optic link into a redundant link.

To install these cards:

- 1 Pull the NT1P62 Fibre Peripheral Controller card's locking devices away from the faceplate. While holding the card by these devices, insert the card into the card guides in slot 1. Refer to Figure 16 for card positions in the shelf.
- 2 Slide the card into the cabinet until it engages the backplane connector, and then push the locking device levers towards the faceplate to insert the card connector into the backplane connector and lock the card in place.

- 3 If not already installed, install the NT1P63 Electro-optical packet on the NT1P62 Fibre Peripheral Controller card by inserting the NT1P63 Electro-optical packet, connector first, through the NT1P62 Fibre Peripheral Controller card faceplate opening and plugging it into the connector on the NT1P62 Fibre Peripheral Controller card. If only one NT1P63 Electro-optical packet is required (for single link operation), for consistency, insert the NT1P63 Electro-optical packet into the top connector and install the blank packet into the bottom connector.
- 4 Install IPE cards in slots 2 through 11 by pulling the card locking devices away from the faceplate and inserting the cards into the card guides, engaging the backplane connector, and locking the card in place by pressing the locking devices against the card faceplate.

Connecting fibre-optic link to the wall-mounted cabinet

In the wall-mounted cabinet configuration, the fibre-optic link connects to the fibre management frame located within 100 feet of the cabinet. From the fibre management frame, the optical cable is routed to the cabinet and connected directly to the NT1P63 Electro-optical packet FC/PC optical connectors located on the NT1P62 Fibre Peripheral Controller card faceplate. Figure 15 shows a fibre-optic link connected to the NT1P63 Electro-optical packets.

Note: For detailed information on how to interconnect the fibre-optic link and the Fibre Remote IPE wall-mounted cabinet at the fibre management frame, refer to the *Interconnect Configuration Installation and maintenance* (A0392186) documentation package.

To connect the link:

- 1 Install optical connectors on the link fibres and connect the link to the fibre management frame optical connectors.
- 2 Install the optical connectors at the end of each fibre of the NT1P79 optical cable, and insert each connector into the fibre management frame connector where the corresponding link fibre is connected. Repeat this for each NT1P79 optical cable coming from the wall-mounted Fibre Remote IPE cabinet.

- 3 At the Remote IPE cabinet, carefully push the cable end(s) through the protective tubing to guide, support, and protect the cable under the cabinet, as shown in Figure 15.

Note: When handling fibre-optic cables, do not bend them more than their minimum allowed bending radius of 1.4 inches (3.5 cm).

- 4 Wrap each cable around a plastic drum located at the bottom left-hand side of the cabinet as viewed from the front. Extend it through the hole at the bottom of the cabinet as shown in Figure 15. For a redundant link, repeat this step for the second cable.
- 5 At the wall-mounted cabinet, plug the fibre-optic cable with FC/PC optical connectors at one end (as supplied with the cabinet) into the Fibre Peripheral Controller card Electro-optical packetlet(s) in the cabinet.
 - Identify the transmit and receive FC/PC optical connectors on the cable and the transmit and receive FC/PC optical connectors on the NT1P62 Fibre Peripheral Controller faceplate.
 - Plug the cable FC/PC optical connector marked Tx₀ into the lower FC/PC fibre-optic connector on the Electro-optical packetlet marked Tx₀ located on the Fibre Peripheral Controller faceplate.
 - Plug the link's FC/PC optical connector marked Rx₀ into the upper FC/PC fibre-optic connector on the Electro-optical packetlet marked Rx₀ located on the Fibre Peripheral Controller faceplate.
 - Repeat the previous two steps for the link's FC/PC optical connectors Tx₁ and Rx₁, for a redundant link.

Figure 15 shows the tube that protects the fibre-optic link cable from damage. It also shows the routing of the fibre-optic link to the FC/PC optical connectors on the NT1P63 Electro-optical packetlets installed in the NT1P62 Fibre Peripheral Controller card.

Figure 15
Optical cable routing for the wall-mounted cabinet

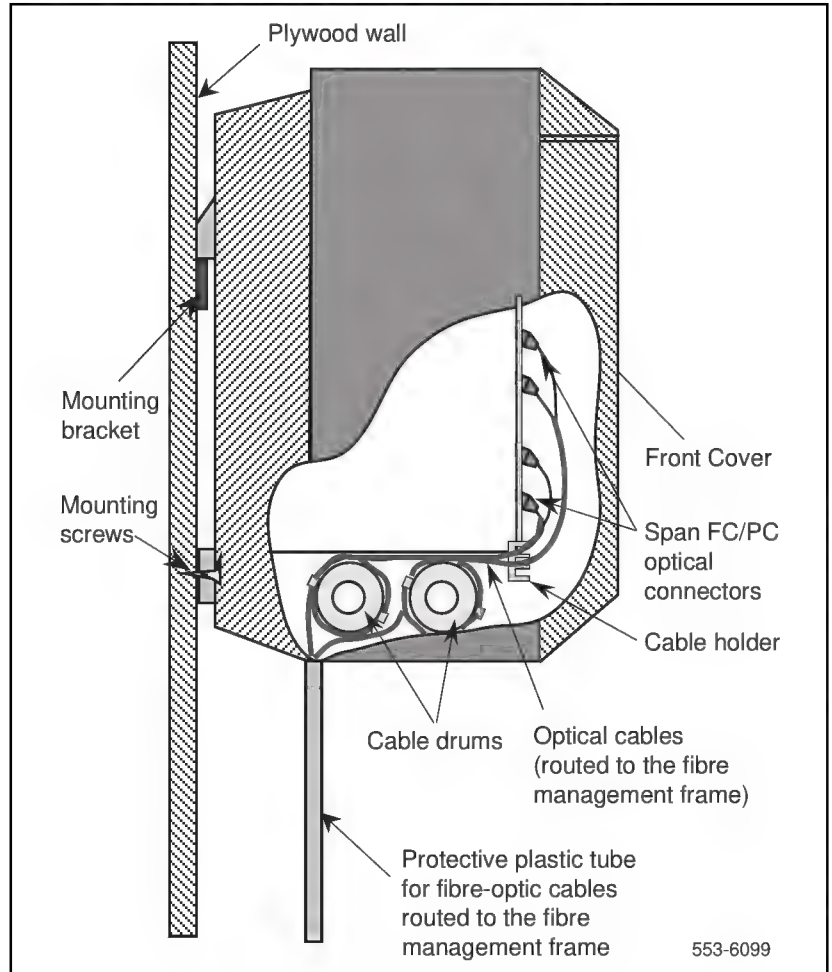
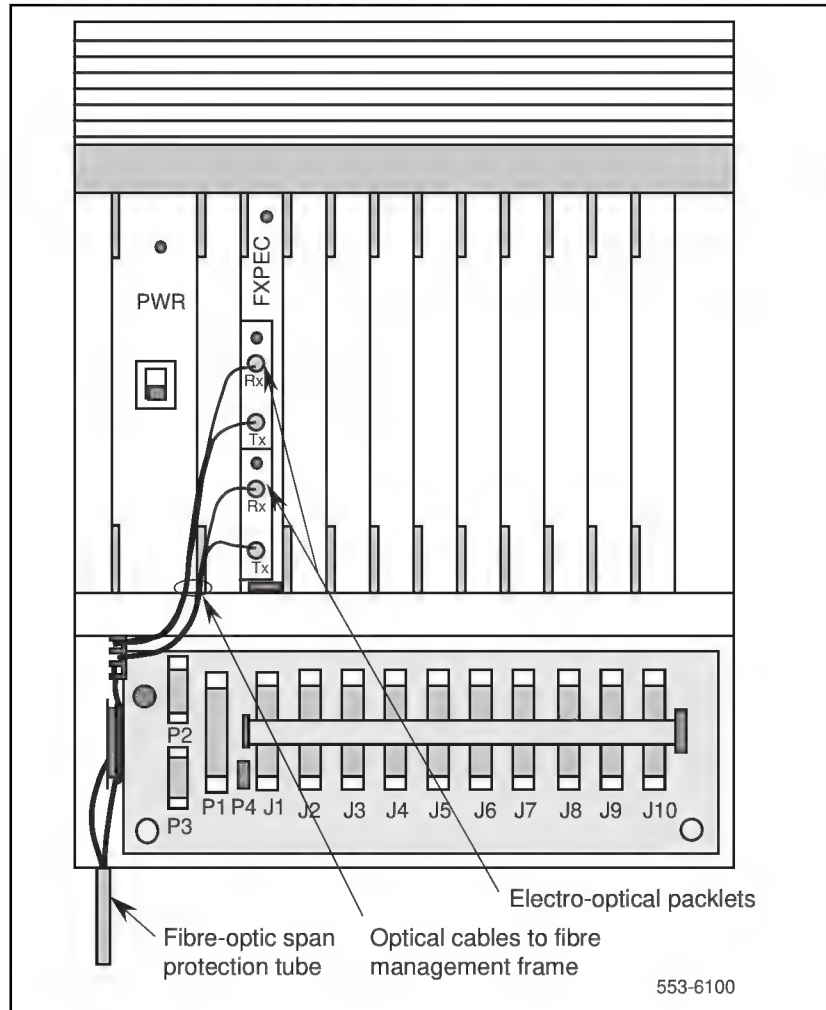


Figure 16 shows the Fibre Remote IPE cabinet with IPE cards, the NT1P62 Fibre Peripheral Controller card, and link connectors already installed.

Figure 16
Link connections on the IPE cabinet



Connecting TTY and subscriber loop cables

In the cabinet option, the monitoring is performed by the NT1P62 Fibre Peripheral Controller card, which receives power fail signals from the power supply through the backplane and sends the information to the NT1P61 Fibre Superloop Network card for processing by the Meridian 1 CPU.

A terminal or a TTY connection to the MMI port and subscriber loop connections at the bottom of the cabinet should be made as shown in Figure 17. The terminal or the TTY is used for configuration and maintenance of the remote site. The terminal or TTY transmission characteristics are 9600 bps, 8 bits, no parity.

Note: To set the TTY interface characteristics on an SDI card, refer to switch settings in *Circuit card installation and testing* (553-3001-211).

To connect a terminal or TTY to the MMI port:

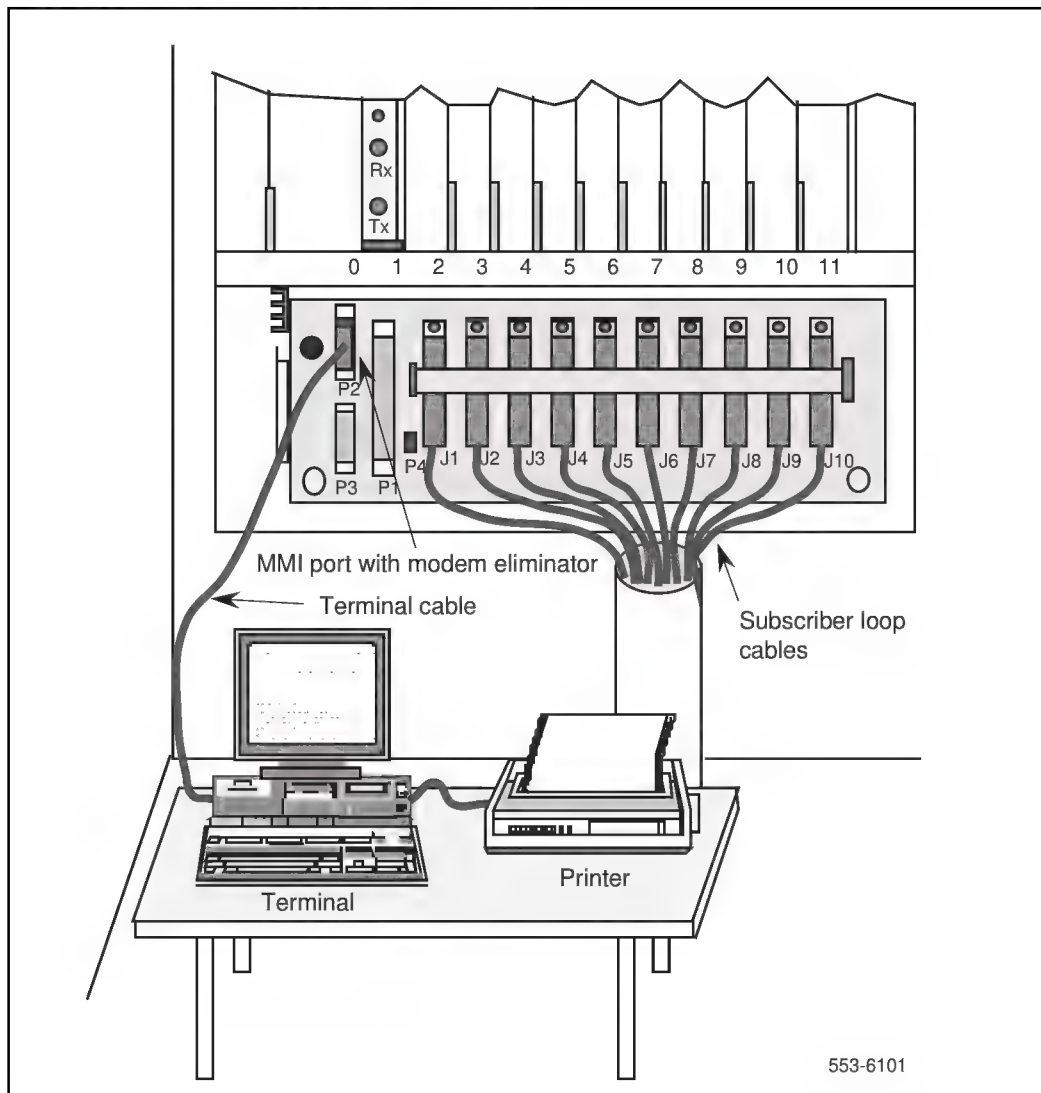
- 1 Plug the 9-pin D-type connector at the one end of the NT8D46AG cable into the P2 connector located at the lower left-hand side of the backplane, when viewed from the front or the cabinet.
- 2 Plug the other end of the NT8D46AG cable into the terminal or TTY RS232 connector.

To connect subscriber loop (tip and ring) cables to the cabinet's 50-pin connectors J1 through J10, refer to Figure 17. These cables have already been connected to the Main Distribution Frame (MDF) in the preinstallation preparation phase according to the instructions in *Cabling lines and trunks, Meridian 1 system installation procedures* (553-3001-210):

- 1 Remove the locking bar from connectors J1 through J10.
- 2 Install the 50-pin connector terminating the cable designated J1 and plug it into the connector at the bottom of the cabinet also designated J1.
- 3 Repeat step 2 for the remaining tip and ring cables from J2 through J10.
- 4 Replace the locking bar over the cable connectors you just installed.

Figure 17 shows the subscriber loop (tip and ring) connectors that link line cards to the MDF and the terminal connection.

Figure 17
TTY and subscriber loop cable connections



Connecting attendant console power cord to the wall-mounted Fibre Remote IPE

The wall-mounted cabinet backplane contains P4, a two-pin power connector that provides +15 V and -15 V power source for the attendant console.

To make this connection:

- 1 Connect the attendant console power cord to P4 on the wall-mounted cabinet backplane.
- 2 Install and configure the attendant console. Refer to *Telephone and attendant console installation* (553-3001-215) and *M1250 and M2250 Attendant Consoles description* (553-2201-117).

Connecting PFTU to the wall-mounted Fibre Remote IPE

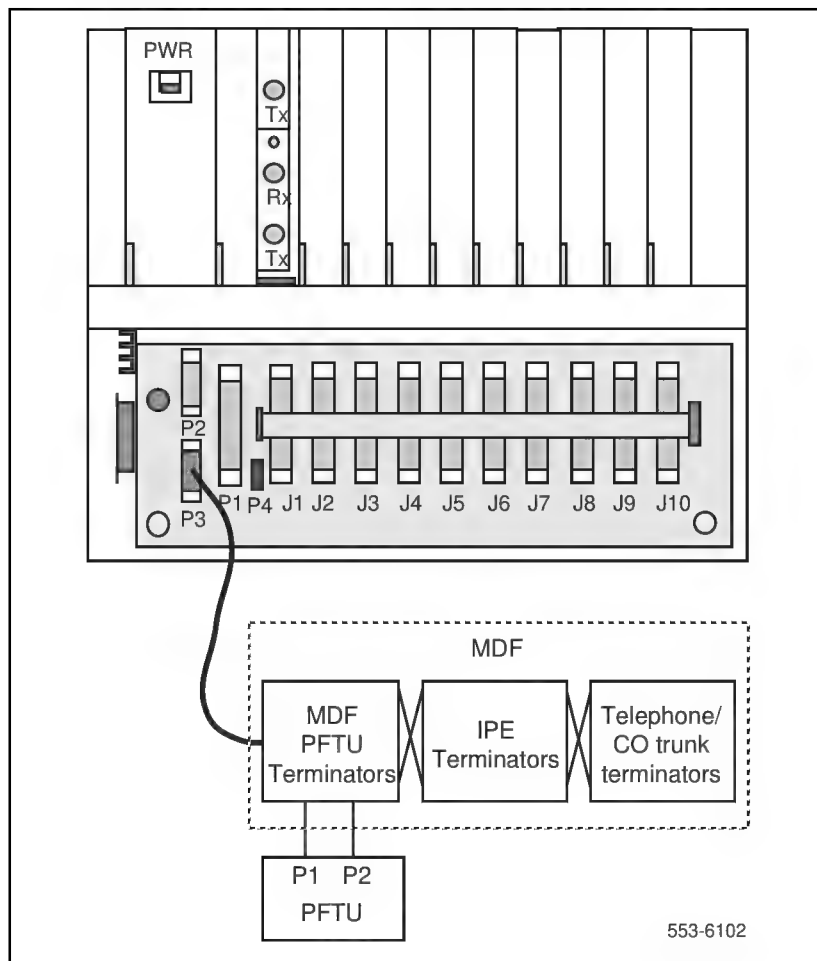
In the wall-mounted cabinet option, the Power Fail Transfer Unit (PFTU) is connected as shown in Figure 18.

To make this connection:

- 1 Install the PFTU near the MDF and connect it to the MDF according to the instructions in the PFTU user manual.
- 2 Install the required cable between the PFTU and the P3 15-pin D-type connector on the wall-mounted cabinet. For more information on how to install the PFTU, refer to *Meridian 1 system installation procedures* (553-3001-210).

Figure 18 illustrates the front view of the wall-mounted Remote IPE cabinet. It shows the connection of the P3 Auxiliary 15-pin D-type connector on the Fibre Remote IPE wall-mounted cabinet linking the cabinet to the PFTU and the MDF.

Figure 18
Connecting PFTU to the wall-mounted Remote IPE cabinet



Configuring the Fibre Remote IPE

The configuration and administration of the Fibre Remote IPE and the corresponding fibre-optic equipment at the Meridian 1 local site is identical to the standard Meridian 1 configuration and administration and does not require special considerations.

However, some initial setup functions must be considered at the remote site to identify the remote site system monitor functions of the wall-mounted cabinet to the Meridian 1 CPU. These functions are administered over a Man-Machine Interface (MMI) port connected to a terminal or a TTY at the remote site. These are:

- Configuring fibre-optic cards
- Configuring the system monitor address
- Defining the loadware
- Configuring the MMI port

Configuring fibre-optic cards

When the Fibre Remote IPE equipment is first installed, you must specify the following functions:

- Define the NT1P61 Fibre Superloop Network and NT1P62 Fibre Peripheral Controller cards as standard NT8D04 Superloop Network and NT8D01 Peripheral Controller cards.

- Load Configuration Record Program LD 97 to configure the Fibre Remote and superloop parameter data blocks.

Prompt	Response	Comment
Fibre Remote Parameters Data Block		
REQ	CHG	Change the Fibre Remote parameters
TYPE	FIRP	Fibre Remote parameters
SUPL	0-156	Superloop number associated with the Remote IPE shelf
NNDC	5-(7)-8	No-New-Data-Calls condition threshold
XSMN	(0)–63	System monitor address on the Remote IPE shelf
Superloop Parameters Data Block		
REQ	CHG	Change superloop data block
TYPE	SUPL	Superloop type
SUPL	0-156	Superloop number in multiples of 4
ST21	(NO) YES	System type 21
SLOT	(L) R	Network slot default (left) or right
SUPT	FIBR	Superloop type (Fibre)
XPE0	x 0 3	x= Fibre Peripheral Controller card, 0= starting segment, 3= ending segment
XPE1	<cr>	Fibre Peripheral Controller card 1. Usually not equipped in Fibre Remote IPE.
XPEC	1-95	Fibre Peripheral Controller card number. The superloop block is built with default parameters.

Configuring the system monitor address

Configure the system monitor address and Fibre Peripheral Controller card parameters:

- Set switches on the system monitor card to specify a unique number from 1 to 63 and the slave mode for the floor-standing Fibre Remote IPE.
- Define the system monitor address using the MMI port to identify the system monitoring functions for a wall-mounted Fibre Remote IPE cabinet, which does not contain an actual system monitor card. Specify a unique number from 1 to 63 for this system monitoring function.

- Enter time-and-date using the terminal or TTY connected to the MMI port of the Fibre Peripheral Controller or NT1P61 Fibre Superloop Network card.

Defining the loadware

Define the loadware version being downloaded using the terminal or TTY connected to the MMI port as follows:

- Load Print Program LD 22 on the system TTY and print the PSDL directory by executing

Prompt	Response	Comment
REQ	PRT	Request printing of peripheral software versions
TYPE	.PSWV	Peripheral software versions downloaded to the Fibre Superloop Network and Fibre Peripheral Controller cards

- Through the MMI port, enter the QVER command to check the firmware and loadware version on the Fibre Superloop Network card and the Fibre Peripheral Controller card.
- Compare the loadware version obtained by printing the PSDL directory using Print Program LD 22 with the version obtained using the QVER command over the MMI terminal. The two versions must be identical. If not identical, use the SVER command at the MMI terminal to set the PSDL number of the card equal to the number obtained by Print Program LD 22.
- Parameters configured with default values, such as MMI default mode, should not be changed unless default values are not acceptable.

Command	Comment
HELP	Displays a list of commands
<ESC>L	Changes the Fibre Superloop Network or Fibre Peripheral Controller card to MMI mode.
<ESC>R	Changes the Fibre Superloop Network or Fibre Peripheral Controller card to SL-1 mode.
SDEF L/R	Sets default mode to Local or Remote .
QDEF	Queries the MMI port default mode. Response can be Local or Remote .

STAD	Sets the time-and-date.
<d/m/y/h/m/s>	
SXSM n	Wall-mounted Fibre Remote IPE cabinet does not have a system monitor card. n specifies a slave system monitor number (1–63), which is identified by the Meridian 1 CPU as a slave system monitor.

Configuring the MMI port

The MMI port may be configured in the local (or MMI) mode or the remote (or SL-1 mode).

MMI mode

In the MMI mode, a terminal or TTY is connected to the local MMI port at the Fibre Superloop Network card and another terminal or TTY is connected to the local MMI port at the Fibre Peripheral Controller card. Each terminal is controlling the local MMI functions of the card it is connected to.

MMI commands can be issued at each terminal to control local functions or a submit (SUBM) command and a string can be issued from a terminal or TTY to control the functions of the card at the opposite end of the fibre-optic link.

Note: When entering MMI commands, use solid caps.

The default MMI interface characteristics are set in the Fibre Peripheral Controller card EEPROM as follows:

- Speed—9600 bps
- Character width—7 bits
- Parity bit—space

SL-1 mode

In the SL-1 mode, a terminal or TTY is connected to the MMI port at the Fibre Peripheral Controller card. This terminal or TTY becomes the Meridian 1 TTY. At the Fibre Superloop Network card, the MMI port is connected to an SDI port and not to a terminal or a TTY.

For the MMI port at the Fibre Peripheral Controller card to be able to communicate with the SDI port connected to the Fibre Superloop Network card MMI port, the interface characteristics must be as follows:

- Speed—9600 bps
- Character width—7 bits
- Parity bit—space

Using Fibre Peripheral Controller card MMI terminal, place the Fibre Superloop Network card in the remote mode by executing **>SUBM R <cr>** and place the Fibre Peripheral Controller card in the remote mode by executing **>(esc) R <cr>**.

Therefore, no interface configuration steps are required whether the MMI port at the Fibre Remote IPE is configured in the MMI mode or the SL-1 mode.